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ABSTRACT

This brief leaflet for parents states that "the most important thing you can do is to reinforce the mathematics lessons your child receives in school." The helping strategies are designed for use with children in grades one through three, but may also be useful for older children having difficulty in mathematics. Four types of skills children have when they come to school are listed. Three essentials needed to learn mathematics are described: understanding, practice, and seeing patterns. Some characteristics of good problem solvers are also noted. Suggestions for working with a child on counting, estimating and measuring, and correcting mistakes are given. Finally, some do's and don't's are listed. (MNS)

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Help Your Child Learn Math

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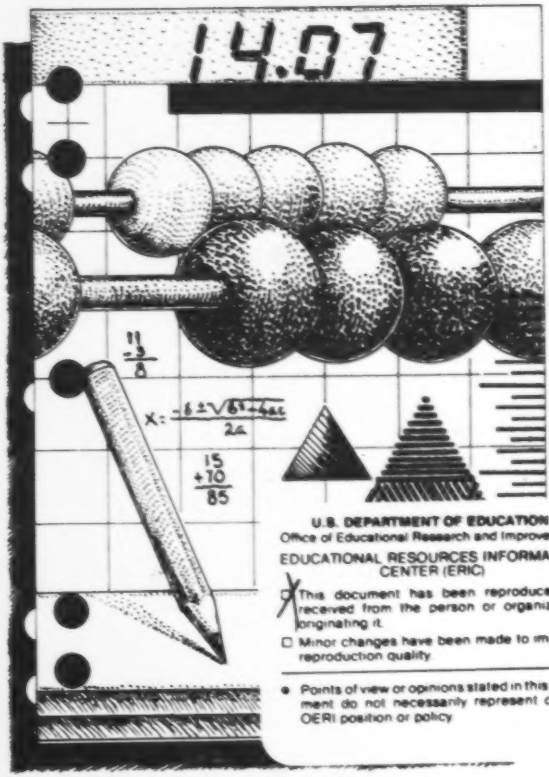

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"We must make sure we have put our children first and that their education is a top priority."
President Ronald Reagan

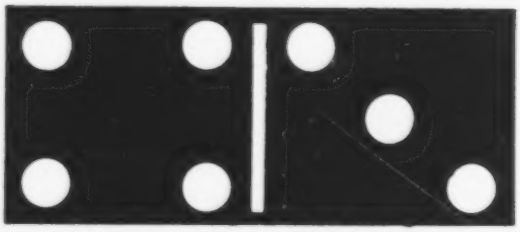
Your child probably loves games. Puzzles, too. That's why it's helpful to connect the games and puzzles played at home with the math taught in school.

You can help make "the math connection" so that your child will find it easier to learn and like math.

What to do?

The Office of Educational Research and Improvement (OERI) believes the most important thing you can do is to reinforce the math lessons your child receives in school. You needn't be a teacher or a mathematical genius. Just use the "helping" strategies described in this leaflet.

These strategies are best for helping first-, second-, and third-graders, but they may be useful also for an older child who has difficulty with math.

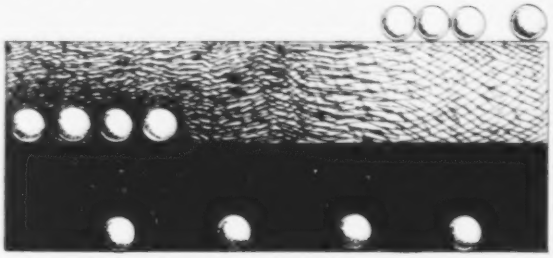


It Comes Naturally!

Math is learned naturally by the inventive, curious mind. Pre-schoolers are easy and confident with numbers. They love to count and use counting a number of ways. By the time they enter kindergarten, they have many practical—but informal—math skills. For example:

- They can deal comfortably with situations requiring an idea of what is largest, smallest, tallest, longest, inside, outside, closest, farthest, and the like.
- They can do simple addition and subtraction by counting and looking at actual objects—apples, pencils, books, etc.
- They can estimate proportions for groups of objects—for example, they can tell that a group of 10 marbles is closer in size to a group of 12 marbles than a group of 12 is closer to 20.
- They can correctly count to 10 and beyond and many can count to 14 or more.

However, they do not have an adult's understanding of what numbers mean, and they are easily distracted by irrelevant detail. So don't be surprised if a pre-schooler fails to see that the number of marbles in a row doesn't increase when the row is spread out. . . or decrease when the marbles are crowded together.



Essentials

Three things are essential for a child to learn math and all three are things you can help reinforce.

Understanding. The child must understand the steps involved in working and solving a math problem. If the child's ability to solve problems is based solely on memorization without understanding, the ability won't carry over from one problem to another.

Practice. This means practicing the base skills—addition, subtraction, multiplication, division, fractions, and decimals—so that the child can learn and remember them and then use them correctly.

Seeing Patterns. Children need to see patterns and regularity in math and ways of organizing mathematical information. Math builds and extends simple ideas into more general concepts.

Good problem-solvers have certain things in common: They are quick to understand the important features of a problem; they approach a problem with confidence, and they can transfer their learning from one problem to another. When they get an answer to a problem, they know whether the answer is reasonable because they estimate well.

Counting

Counting is a mixed blessing. It's essential for learning addition and subtraction. It becomes a detriment only for children who rely on it too heavily—especially, on fingercounting—so that they never adopt more efficient ways of doing math. (For one thing, they are slower than other students and can't work as many problems.)

What is counting? It's not just reciting a string of numbers. It includes such things as matching objects and arriving at totals. Research has identified six stages that a child must go through in counting, beginning with rote-counting (1,2,3,4, etc.) and becoming progressively more sophisticated (for example, counting up 7 from 44 to 51 or counting back 3 from 12 to get 9). Following this, the child is ready for open addition problems such as 13 + ? = 19.

To help your child develop confidence in counting, use concrete objects and examples. Drop 5 marbles in a jar and have the child count as you drop additional marbles in the jar: 6, 7, 8, 9, etc. Use rhymes and songs like the one that begins "One, two, buckle my shoe. . ."

If the child has trouble keeping a mental tally when counting from one number to another, suggest reciting the first number in a soft voice and the next numbers in a progressively louder voice.

Use familiar, repetitious situations to reinforce counting. Encourage the child to count with the secondhand as it sweeps around the clock. Count the dishes on the table. Count the number of cookies in a box. . . the bikes in a bike rack. . . the leaves on a plant.

Have the child touch each object as it is counted. Arrange the objects in various positions—in lines, in rows, in circles, and randomly. This will assist the child's understanding of numbers.

Estimating & Measuring

Estimation is one of the cornerstones of math. It can enrich counting, measurement, and problem-solving abilities. A child who can make a good estimate of the answer to a problem clearly understands the problem. Children who can estimate are able to reject unreasonable answers and know when they are "in the ballpark."

Despite the importance of estimation, few schools stress it. Those schools that use estimation in teaching arithmetic generally don't introduce it soon enough. Yet even children in kindergarten can correctly estimate relative sizes and proportions.

You can help your child develop estimation skills by helping him/her practice rounding numbers to the nearest 1, 10, 100. This is a strategic step in acquiring this skill.

Practice estimation with your child. "How many marbles do you think are in the jar?" "Who is taller, your father or mother?" "Which is wider—the door or the table?"

Measurement is another essential, and many children are weak in this area. You can help your child with measurement by making comparisons.

Ask if the child has "too much" or "too little" of something and if an object is "too short" or "too long." A typical comparison might be: "Which will require more paper to cover, the bulletin board or the door?"

Help your child practice measuring things that are longer than the measuring instrument—such as a meter stick. Include measurements that involve fractions other than one-half.

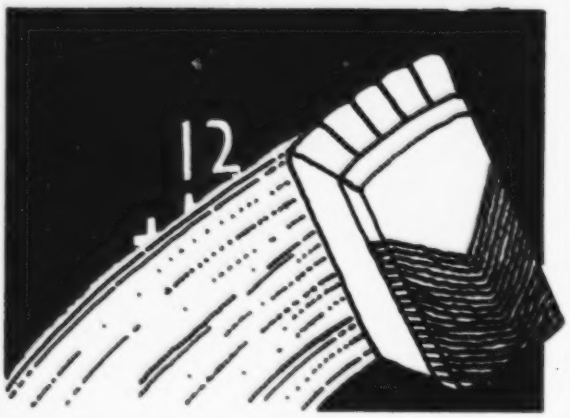
Make a floor plan of your house or apartment with your child's help. Have the child take the measurements with a tape measure while you write down the dimensions.

Time is among the things to be measured. Discuss time with your child rather than "telling time."

"It takes Mother 45 minutes to get to work. When should she leave the house to get to the office by 9:00? When should she leave the office in order to get home by 6:30?"

Age is another measurement. Ask how old the child is in months. . . weeks. . . days. . . hours. . . minutes. (Many experts suggest practicing exercises of this kind with a calculator.)

Correcting Mistakes



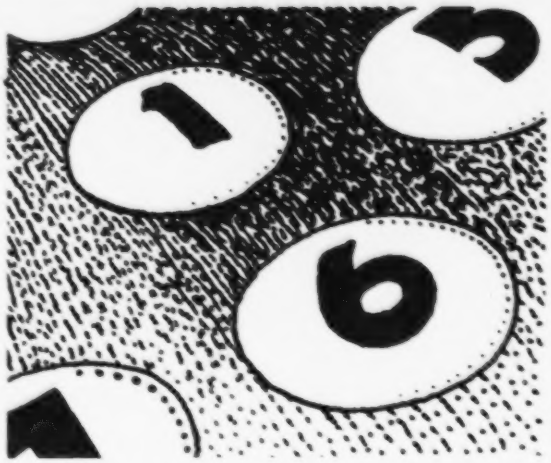
Find out what kinds of mistakes your child makes in arithmetic. Use an arithmetic book to find easier problems of the same type, and have the child rework those problems. Make sure your child understands a simpler problem before going to a more difficult one.

Ask the child to describe how to work a problem, step-by-step. Doing this may help the child to identify the error. While the child is doing this, look for patterns in errors because one misunderstanding may cause others like it.

If a child consistently makes a subtraction error (25–16 = 19) and you are not sure whether this is from carelessness or lack of understanding, use objects to work with the child. Place 25 marbles in a jar and ask the child to remove 16. Make sure that the child checks the subtraction with addition (19 + 16 = ?)

If your child has difficulty with word problems, remind your child to concentrate on the information that is essential to solving the problem. Sometimes a problem includes irrelevant information that confuses the child.

Do's and Don't's



Do ask your child's teacher about the kinds of help that you as a parent can provide. Your role is to reinforce and help your child practice the things taught at school.

Do encourage a child to restate what a mathematical word problem is all about—the information it gives and the information it asks for. Putting it in the child's own words will help clarify it.

Do make sure that "home" math has a noticeable problem-solving flavor. It should contain a challenge or question that must be answered. ("How many nickels do you have in your bank? How many do you need to buy an ice cream cone?")

Do use objects that your child can touch, handle, and move. Researchers call these things "manipulatives." They can be any familiar objects such as soft toys, blocks, marbles, drinking straws, fruit, etc.

Do reward your child with praise for the correct answers. This helps build the child's confidence in problem-solving.

Don't tell your child that some people are "no good" in math. Never tell your child you are "no good" in math, no matter how low your opinion is of your own skills!

Don't think that girls aren't as good in math as boys.

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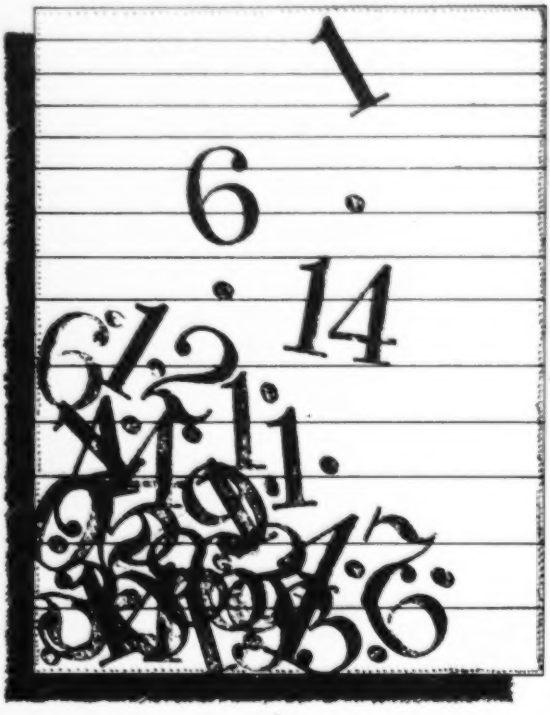
OERI's learning strategies are helping many parents help their children learn math. We hope they will be helpful to you and your child.



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"Parents are our children's first and most important teachers; classroom teachers are parents' trustees."

William J. Bennett
Secretary of Education